

MIT NUCLEAR REACTOR LABORATORY

AN MIT INTERDEPARTMENTAL CENTER

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July 28, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Room
Washington, DC 20555

Re: Massachusetts Institute of Technology; License No. R-37; Docket No. 50-20;
Reportable Occurrence 50-20/2011-3: Operation with Fewer than the Required
Number of Nuclear Safety Channel Level Scrams; NRC OPS Center Log #47-
071

Dear Sir or Madam:

The Massachusetts Institute of Technology hereby submits a report of an occurrence at the MIT Research Reactor (MITR) in accordance with paragraph 7.7.2 of the Technical Specifications. An initial report was made by telephone to the U.S. Nuclear Regulatory Commission Headquarters Operations Center on 19 July 2011.

The format and content of this report was based on Regulatory Guide 1.16, Revision 1.

1. Report No. 50-20/2011-3; Ops Center No. 47-071
- 2a. Report Date: 28 July 2011
- 2b. Date of Occurrence: 18 July 2011
3. Facility MIT Nuclear Reactor Laboratory
4. Identification of Occurrence:

A startup of the MIT Research Reactor was conducted on 18 July 2011, with only one operable nuclear safety channel level scram. Technical Specification No. 3.2.3 requires that there be at least two such operable channels prior to the reactor's being brought critical.

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5. Condition Prior to Occurrence:

Full power instrumentation and mechanical checklists had been completed in preparation for a scheduled reactor startup. Nuclear safety channel No. 5, which is one of three channels that provide an automatic shutdown signal on high reactor power, had been undergoing maintenance and was considered out-of-commission pending further observation of its performance. In addition, a detector signal cable had been replaced on channel No. 3 (a period safety channel). This detector is located in the same instrumentation port, 3GV3, as channel No. 6. (Note: Channel Nos. 1-3 are the period safety channels and channel Nos. 4-6 are the neutron flux level channels. The flux level channels do not normally give measurable indication of a power level until the reactor power reaches ~1 MW.)

6. Description of Occurrence:

The reactor was started up at 0941 on 18 July 2011, brought up in 500 kW steps, and reached a power level of 1 MW at 1207. It is at this power level that the level channels should begin to give a small indication of level response. It was noted by the operator that channel No. 6 had not shown such indication. Because of the ambiguity of indication at such low power, it was decided to increase power to 1.5 MW to check for a response on channel No. 6. At 1.5 MW, it was determined that channel No. 6 continued to show no indication and the reactor was manually scrammed at 1245. Level channel No. 4 was observed to have been operating properly during the entire time.

7. Description of Apparent Cause of Occurrence

Following the shutdown, channel No. 6 was inspected and it was found that the channel No. 6 detector signal cable was connected to the channel No. 3 picoammeter. Subsequent examination indicated that the cables in 3GV3 were not labeled at these connection points, causing confusion as to which were the proper detectors. In addition, because of miscommunication with the control room operator, the instrumentation supervisor had the mistaken impression that the channel No. 3 detector was the only operable one in 3GV3.

8. Analysis of Occurrence:

Level safety channel No. 5 had been declared out-of-commission prior to the reactor startup. Channels No. 4 and No. 6 had been set to provide automatic scrams at the proper setpoint, 6.5 MW. As noted above, channel No. 6 was not capable of

performing its intended function. Safety channel No. 4 was observed to be operating properly and would have caused a scram if reactor power had exceeded the setpoint of 6.5 MW.

9. Corrective Action:

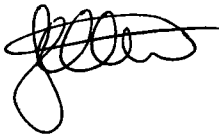
The immediate corrective action consisted of shutting down the reactor upon determination that channel No. 6 had no indication. The long-range corrective actions consist of:

- 1) Ensuring that all channels' cables are properly labeled at all connection locations. (Action completed, 19 July 2011.)
- 2) Recalibration of channel No. 6 and verification that it is operable. (Action completed, 20 July 2011.)
- 3) Retraining of all licensed and maintenance personnel to highlight the importance of proper communication with the control room operator as well as the important role of documentation and attention to detail. (Action to be completed by 31 July, 2011.)

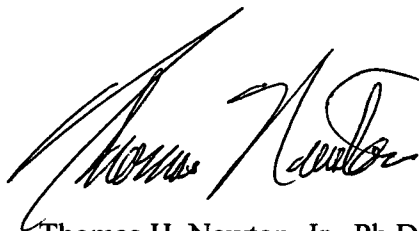
10. Failure Data

Related occurrences were documented in ROR 50-20-1979-5 dated 19 October 1979 and ROR 50-20-1989-1 dated 17 March 1989.

Sincerely,



John P. Foster
Superintendent
MIT Research Reactor



Thomas H. Newton, Jr., Ph.D, PE
Director of Reactor Operations
MIT Research Reactor

cc: MITRSC

USNRC - Senior Project Manager
Research and Test Reactors Branch A
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

USNRC - Senior Reactor Inspector
Research and Test Reactors Branch B
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation